

## CLAIMS

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1. A microfastening system comprising:  
a first fastening element including a plurality of extending nanotubes; and  
a second fastening element including a plurality of extending nanotubes,  
wherein said nanotubes of at least one of said fastening elements are selectively  
5 deformable;

whereby upon joining said first and second fastening elements, the extending  
nanotubes from each element become mechanically interconnected without requiring  
the degradation of said nanotubes.

10 2. The microfastening system of Claim 1 wherein said at least one of first  
and second fastening elements further comprise a substrate from which said  
nanotubes extend.

3. The microfastening system of Claim 2 wherein said substrate is formed  
15 from materials selected from the group consisting of metals, carbon, silicon,  
germanium, polymers and composites thereof.

4. The microfastening system of Claim 1 wherein said nanotubes are at  
least partially multi-walled.

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5. The microfastening system of Claim 1 wherein the nanotubes are  
~~functionalized to a non-linear shape.~~

6. The microfastening system of Claim 5 wherein the non-linear nanotubes of said fastening element are selected from hooks, loops, spirals and combinations thereof.

5 7. The microfastening system of Claim 1 wherein said nanotubes of at least one of said fastening elements are selectively deformable.

8. The microfastening system of Claim 1 wherein said fastening elements are reusable.

10 9. A microfastener comprising:  
a substrate including an attachment surface; and  
a plurality of functionalized selectively deformable non-linear nanotubes attached to and extending from said attachment surface.

15 10. The microfastener of Claim 9 wherein said substrate is formed from materials selected from the group consisting of metals, carbon, silicon, germanium, polymers and composites thereof.

20 11. The microfastener of Claim 9 wherein said nanotubes are at least partially multi-walled.

12. The microfastener of Claim 9 wherein the non-linear nanotubes of said fastening element are selected from hooks, loops, spirals and combinations thereof.

13. ~~The microfastener of Claim 9 wherein at least some of the nanotubes of said microfastener are selectively deformable.~~

14. A method of manufacturing a microfastener comprising the steps of:  
5 a) providing a substrate having an attachment surface;  
b) introducing a plurality of open ended selectively deformable nanotubes to said substrate whereby said nanotubes are attracted to said attachment surface and become affixed thereto.

10 15. The method of Claim 14 wherein said nanotubes are functionalized prior to attaching to said substrate.

16. The method of Claim 14 wherein said nanotubes are functionalized during attachment to said substrate.

15 17. The method of Claim 14 wherein said nanotubes are functionalized after attachment to said substrate.

18. The method of Claim 14 wherein said substrate is formed from materials  
20 selected from the group consisting of metals, carbon, silicon, germanium, polymers and composites thereof.

19. The method of Claim 14 wherein said nanotubes are at least partially multi-walled.

20. The method of Claim 14 wherein the non-linear nanotubes of said fastening element are selected from hooks, loops, spirals and combinations thereof.

21. The method of Claim 14 wherein at least some of said nanotubes are  
5 selectively deformable.

22. The method of Claim 14 wherein said nanotubes are attached to said substrate in the presence of an electric field.

10 23. The method of Claim 14 wherein said microfastener is reusable.

~~24.~~ A microfastening system comprising:  
a first fastening element including a plurality of extending nanotubes; and  
a second fastening element including a plurality of extending nanotubes,  
15 wherein said nanotubes of at least one of said fastening elements are selectively deformable;

whereby upon joining said first and second fastening elements, the extending nanotubes from each element become mechanically interconnected.

20 25. The microfastening system of Claim 24 wherein said at least one of first and second fastening elements further comprise a substrate from which said nanotubes extend.

26. The microfastening system of Claim 25 wherein said substrate is formed from materials selected from the group consisting of metals, carbon, silicon, germanium, polymers and composites thereof.

5 27. The microfastening system of Claim 24 wherein said nanotubes are at least partially multi-walled.

28. The microfastening system of Claim 24 wherein the nanotubes are functionalized to a non-linear shape.

10 29. The microfastening system of Claim 28 wherein the non-linear nanotubes of said fastening element are selected from hooks, loops, spirals and combinations thereof.

15 30. The microfastening system of Claim 24 wherein said fastening elements are reusable.

20 31. A microfastener comprising:  
a substrate including an attachment surface; and  
a plurality of functionalized selectively deformable non-linear nanotubes attached to and extending from said attachment surface.

32. The microfastener of Claim 31 wherein said substrate is formed from materials selected from the group consisting of metals, carbon, silicon, germanium, polymers and composites thereof.

5 33. The microfastener of Claim 31 wherein said nanotubes are at least partially multi-walled.

34. The microfastener of Claim 31 wherein the non-linear nanotubes of said fastening element are selected from hooks, loops, spirals and combinations thereof.

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~~35. A method of manufacturing a microfastener comprising the steps of:~~

~~a) providing a substrate having an attachment surface;~~

~~b) introducing a plurality of open ended selectively deformable non-linear nanotubes to said substrate whereby said nanotubes are attracted to said attachment surface and become affixed thereto.~~

15 36. The method of Claim 35 wherein said nanotubes are functionalized prior to attaching to said substrate.

20 37. The method of Claim 35 wherein said nanotubes are functionalized during attachment to said substrate.

38. The method of Claim 35 wherein said nanotubes are functionalized after attachment to said substrate.

39. The method of Claim 35 wherein said substrate is formed from materials selected from the group consisting of metals, carbon, silicon, germanium, polymers and composites thereof.

5 40. The method of Claim 35 wherein said nanotubes are at least partially multi-walled.

41. The method of Claim 35 wherein the non-linear nanotubes of said microfastener are selected from hooks, loops, spirals and combinations thereof.

10 42. The method of Claim 35 wherein said nanotubes are attached to said substrate in the presence of an electric field.

43. The method of Claim 35 wherein said microfastener is reusable.

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